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ABSTRACT

These guidelines for the development of curriculum for documentalists, information specialists, information scientists, and librarians stress the need for all parties to the information process, in whatever capacity or country, to receive a common training that will enable them to understand one another and to collaborate on equal terms to the progress of information transfer. The first three sections consider the many factors, both general and special, which must be taken into account before the matters of curriculum and content are addressed. The next two sections, which focus on curriculum policies and objectives and program levels, strongly emphasize that there can be no such thing as a definitive detailed curriculum and the guidelines are not intended to provide a "ready-made" curriculum for a particular institution. The final sections on curriculum content and course components are intended to provide a blueprint which can be translated into a curriculum appropriate to the distinctive needs of particular situations. While highly specific scope notes have been avoided, the guidelines indicate the range and scope for information studies and translate this into terms of subjects of study. (RAA)

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PARIS, 18 December 1978

UNITED NATIONS EDUCATIONAL,
SCIENTIFIC AND CULTURAL ORGANIZATION

GUIDELINES FOR CURRICULUM DEVELOPMENT IN INFORMATION STUDIES

Prepared under contract for Unesco by W. E. Saunders

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November 1978
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PREFACE

The object of these guidelines, prepared under contract for Unesco by Professor W. L. Saunders, Director, Postgraduate School of Librarianship and Information Science, University of Sheffield, United Kingdom, is to provide help and guidance to institutions and individuals charged with the responsibility for creating and developing information studies curricula for the preparation of documentalists, information scientists and librarians, with particular emphasis on the needs of developing countries.

The writing of this text grew out of a recommendation made at the second session of the UNISIST Ad Hoc Committee on Education and Training Policy and Programme (Paris, May 1976) where it was suggested that the following studies be prepared:

Guidelines for Formulation of a Policy on Education, Training and Development of Library and Information Personnel (in preparation);

Methodology for Information Manpower Forecasting (in preparation);

Guidelines for Curriculum Development in Information Studies.

In preparing these guidelines the writer drew extensively on the considerable literature on the subject of curriculum development in the information field and consulted curricula from a large number of individual institutions. The present text has benefited from the review by an international group of specialists and the relevant international professional organizations of an outline of the proposed guidelines and of the first draft of the text.

Further suggestions for improvement of the guidelines from the readership are most welcome and should be addressed to:

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I. INTRODUCTION

1. The concern of the guidelines is with courses of basic education and training rather than with particular specializations and the principal target groups are those which are variously known as documentalists, information specialists, information scientists, librarians. The emphasis on a basic course, an emphasis which comes through with great relevance in Schur's important OECD report on Education and Training for Information Specialists(1) when he writes of the universal co-operation, co-ordination and collaboration among systems locally, nationally and internationally and the consequent need for staff with a broad basic professional education. This basic education, he goes on to point out, may be seen as the common ground between specialists of various types. A similar point is made in Unesco's Study Report on the Feasibility of a World Science Information System(2), where it is stated that the "growing complexity of multinational information systems with respect to document analysis and processing requires that all parties to the operation, in whatever capacity and country, receive a common training which will enable them to understand one another and to collaborate on equal terms to the progress of information transfer".

2. There are of course certain specialists, notably information analysts and computer scientists and technologists, who make important contributions to the information transfer process but whom it would be both unnecessary and unrealistic to require to follow a full basic course. For them, certain elements, or modules, from a basic course will suffice, and these will be identified in the relevant section of the guidelines.

3. In preparing guidelines such as these it has been essential to keep in mind at all times the great variety of situations to which they are likely to be applied. A good deal of attention is consequently given in the first three sections of the guidelines to the many factors, both general and special, of which those responsible for curriculum development must take account before they can turn their attention to specific matters of curriculum and content.

4. In regard to the curriculum itself it cannot be too strongly emphasized that there can be no such thing as a definitive detailed curriculum; that neither these guidelines nor any other similar publication can provide a curriculum "ready-made" for a particular institution. What the guidelines can do is indicate the range and scope of information studies and translate this into terms of subjects of study, organized for convenience on a modular basis.

5. The careful study of Sections VI and VII should provide a blueprint which can be translated into a curriculum appropriate to the distinctive needs of particular situations. The listing of highly specific topics has been avoided, for reasons set out in paragraphs 75 to 77. It has likewise been decided not to present elaborate scope notes for each subject mentioned since to do so would not only make for undesirable length and tediousness, but could imply a rigidity which is undesirable and even dangerous in a dynamic field such as information studies. The scope and connotation of the subjects mentioned should in any case be known already to those who are expected to teach them, but if further information is needed they may usefully turn for inspiration and assistance to the list of sources set out in paragraphs 78 to 79. It is of course for individual lecturers to produce their own course outlines and to keep them under constant review.

II. FACTORS OF A GENERAL CHARACTER

6. Stage of development and distinctive information needs of the country or region. The term developing countries is widely used and has a generally accepted connotation which is both convenient and useful for the present purpose. It must be remembered however that it covers countries at very different stages and with very different development potentials, countries as different as Iran and Bangladesh, Rwanda and Nigeria. While most developing countries are agriculture based, there are those with the intention and resources to industrialize at a very considerable rate; while it may at present be true that the literacy rate in most of them is very low, some have plans which should transform the situation within the next ten or fifteen years. But what is true of virtually all of them, however well endowed economically, is that they lack at present the skilled and experienced labour force required to take full advantage of what modern science and technology has to offer (though India, with large numbers of unemployed graduates, is an exception even to this). In general it is manpower - trained and educated manpower - that is the key element in development; and to remedy the shortage of such manpower is perhaps the greatest challenge which has to be faced by the developing countries and by those in the developed world who wish to assist them.

7. A constant preoccupation for development planners in any field must be that of the level at which to start. What, it might be argued, is the point in preparing a work force for systems depending on advanced and sophisticated telecommunications when communication of all sorts is at the most primitive of levels? But a start has to be made and time is too short to progress through all the stages traversed by already developed countries. The apparent paradox of India's ambitious plan for a National Information System for Science and Technology (NISSAT), at one extreme, while at the other end of the Indian spectrum is an urgent need to communicate basic and relatively simple agricultural techniques to tens of millions of illiterates, at village level, is a dramatic example of this situation. There is no clear-cut answer to the dilemma. The dangers in terms of our own field are pointed out by Foskett(3) when he says "It may well be thought that a greater impression will be created by advanced courses in automation, information storage and retrieval by the most up-to-date computers, games theory and management; but for a developing country, with perhaps an infant publishing industry and dire problems of foreign currency such programmes will not make a powerful contribution to the country's own development in those areas where a good library and information service will count most: in maintaining functional literacy and in supplying specialist information for local needs in industry and agriculture at the appropriate level and in the appropriate form". Unesco's 1971 Study Report on the Feasibility of a World Science Information System(2) makes a similar point when it says "the implementation of machine methods should not be given absolute priority to the detriment of more basic services which can still operate efficiently without them. A more urgent duty is to secure the observance of accepted international standards, in the earlier and more elementary process of information transfer (cataloguing, indexing, abstracting, etc.) so that the products of document analysis in the various systems that are to make up UNISIST will be directly acceptable as input to the national library systems of developing countries".

8. While there is no clear-cut answer to this problem of levels, the right direction is pointed out in the same UNISIST Study Report when it identifies the need to provide librarians and documentalists with graded bodies of knowledge consonant with the operational requirements of multinational and multilingual networks. It is worth drawing attention in passing to one important advantage possessed by many of the developing countries which is of significant help to them in moving in this direction. Those of them that are former colonial territories are likely to have firmly embedded in their culture and their educational systems a widely used language such as English, French or Spanish. In the case of English in particular

this can be an important asset, for it is the language of most of the world's output of science and technology; also that of most of the output in the fields of library and information science.

9. Nature and composition of the national labour force: manpower needs and manpower planning. It has already been pointed out that the term developing countries covers a wide range of stages of development and this is nowhere more clear or more important than in the field of manpower. At the very early stages of development, particularly if a country is just emerging to full independence and nationhood, the number of graduates or graduate equivalent in its population may be tiny indeed. Those who have such a background and training are likely to have their sights set on positions of considerable importance and seniority in the fields of politics, administration and the like, and an acute shortage of highly educated manpower for most of the professions - including librarianship and information work - is likely to be experienced. Characteristically, this will be met by urgent efforts to improve - or create - indigenous educational facilities at tertiary level and, of course, by sending suitably qualified candidates to be trained in universities and other appropriate educational institutions overseas. In parallel with this there is likely to be a manpower plan with targets for the various levels of education and types of skill - number of doctors, number of agriculturists, number of teachers, etc., with an indication of priorities and target dates. In the earliest stages of manpower planning it cannot be taken for granted that library and information manpower will even be included in such plans and certainly the priority and target numbers are likely to be low. This is a situation which is likely to improve with the passage of time, as increasing numbers of highly educated men and women emerge from the educational system and from overseas training. As time passes, "top jobs" will be filled, the pressure on the key professions such as medicine and teaching is likely to be easing, and there is a greater prospect of library and information workers featuring in manpower plans. There is also the prospect, with the increasing output of suitably educated men and women, that more of them will be attracted to the library and information professions than in the very early days when every graduate might realistically aspire to very high office in government or politics.

10. An important implication of this progression is that those planning for the education and training of the library and information professions must take careful and realistic account of the developing situation; and in particular of the quantity and the educational and intellectual calibre of those who are likely to be coming forward for training. A curriculum appropriate for the small number of candidates - probably of relatively low calibre - who will be coming forward for training in the very early stages of development, is unlikely to be suitable for the large numbers of high quality recruits which the profession should be capable of attracting at a later stage in the manpower development process.

11. Though not strictly within the scope of the guidelines it is worth making the point that ensuring the inclusion of trained library and information personnel in a nation's manpower plan is an indispensable step towards a systematic education and training programme for the information professions. Bringing about this inclusion should therefore be a priority claim on the attention and efforts of those concerned with the development of a nation's library and information services.

12. General organization and structure of the higher educational system. Also of the greatest importance to those planning programmes of professional education and training is the organization and structure of a country's higher educational system. A not uncommon situation is a post-secondary or tertiary system with three tiers: university, technological institute and craft or trade college. The university is likely to be concerned primarily with educating men and women in the traditional

academic disciplines - the humanities, the social sciences, science and technology. In addition, they will probably provide professional education for certain learned professions, for example medicine and law. The general ambience of a university is one of advanced study and research though naturally this does not appear overnight in a newly developed country.

13. The technological institutions will normally have a more vocational bias than the universities and will have a greater concern with science, technology and social science in their applied forms. They will be the principal source of the nation's skilled technical manpower and the emphasis is likely to be on high-level training in specific skills and for specific vocations rather than on higher education in the broader sense.

14. The craft or trade college, too, is concerned with training for specific tasks and skills, but at a lower level than the technological institutions. It is likely to be the principal source of the nation's skilled work force.

15. It is widely believed that for the higher levels of study for library and information work - certainly those at post-graduate and undergraduate level - the university provides the most appropriate environment. On general grounds it is beneficial for the status of the profession (a matter of crucial importance in many developing countries) and it is also desirable that future professional leaders should have been educated side by side with others who are destined for positions of leadership in various spheres. More specifically, a university, with its wide range of disciplines - from computing science to management studies, from linguistics to mathematics - is a particularly appropriate setting for the study of present-day library and information science, which is essentially interdisciplinary in character. The nature and special character of a university will also have important implications for the approach to the study and teaching of library and information studies: there should, for example, be a strong emphasis on principles and theory - on "why?", as well as "how?": there should not be too great a load of classroom contact, and a concomitant expectation that students will be capable of studying and finding out for themselves; there will also be an expectation that sooner or later, like any university discipline, library and information science will be generating research and advanced study.

16. If the role of the university is thus seen as that of providing professional education at the higher levels it would seem natural to assume that, as in some developed countries, the training at lower, sub-professional levels, would most appropriately be carried out in the technological institutions. This, indeed, will often turn out to be the case, but it is not advisable to adopt a completely doctrinaire approach to this matter, since there may often be overpowering reasons for carrying out lower levels of training within the university institution that provides the higher reaches of professional education. The main reason for this is likely to be shortage of resources - of specialist teachers, teaching materials, library support, etc. - and the obvious wastefulness and undesirability of attempting to duplicate resources and facilities in a developing country situation. Such considerations as these will often outweigh the argument that such sub-university level teaching may lower the prestige of a teaching department within its parent university.

17. Nature of the educational methods to which students have been conditioned. Closely related to the planning of the curriculum is the question of teaching methods. In paragraph 15, above, the proposition was put forward that teaching in a university should not involve an excessive amount of classroom instruction but should call for independent work and thought by the student himself: the emphasis in fact should be on learning rather than teaching. It is nevertheless a fact that in some developing countries a great deal of emphasis is placed on the absorption

of factual information; this, indeed, may often be by the dictation of notes and their subsequent learning by heart: one has in fact seen students pacing up and down the campus engaged in the rote learning of notes or even sections of textbooks. Such an approach is of course wholely inappropriate in educating students for a rapidly changing profession, subject to considerable and constant technological development, in which practitioners are required to exercise initiative, and to be flexible and adaptable to new and changing circumstances. But learning habits acquired during a full span of primary and secondary schooling are not easily changed and a major challenge to those engaged in creating and developing curricula is to devise programmes that permit the introduction of teaching methods which will gradually place more responsibility on the student, which will make him think for himself and be increasingly self-directing.

18. Library and information infrastructure of the country or region. By this is meant the whole fabric of institutionalized provision of library and information services: the existence of a national library for lending and/or research, and of systematic bibliographical activity and provision; the availability of a network of public libraries, of libraries in university and other academic institutions, of school libraries, of documentation units, information analysis centres, and specialized data bases in support of research; of systematic arrangements for the interlending and exchange of information and documentary materials; of organized professional publication and professional association.

19. All of these factors and facilities contribute in greater or lesser degree to the implementation of education and training, and have a considerable influence on the curriculum and the objectives to which it aspires. It might, for instance, seem a somewhat arid exercise to place great emphasis on on-line retrieval systems in a country which is so deficient in library resources that the references produced in such quantities and with such great speed and efficiency cannot be supplied without recourse to institutions overseas. Similarly it is not easy to teach - or learn - the principles of management applicable to a documentation centre if no such centre is available to bring theory and principles to life. Visits of observation to effective operational units are an important - some would say vital - element in an education and training programme; and perhaps even more important is the possibility of in-service training in such units before, during and after the formal programme of education and training. Operational units of the kind indicated above will, moreover, provide an important source of part-time and specialized teaching staff. The strength of a country's library and information infrastructure has in fact a direct influence on the adequacy of the professional education and training which that country can provide; the stronger and more sophisticated the infrastructure the more effective will be the educational programmes, and the more ambitious the objectives to which those programmes can aspire.

20. Status of library and information science practice. In many developed countries it is not uncommon to find library and information workers accorded the status and salary appropriate both to the central importance of their role in society and to their own high calibre in terms of intellectual qualities, academic and professional qualifications and specialized experience. For example, the information scientist serving a research team may well be on the same salary scale as the scientists who make up that team; the university librarian is often given the salary and status of full professor, with his senior staff likewise being awarded academic equivalence. Unfortunately the situation is often very different in developing countries, as the following extract from Grünewald[4] makes clear. "Another problem, of course, is the low social status of librarians and other information workers in most of the countries, which finds its expression in rather low salaries. These in turn do not serve to attract high-quality personnel and thus aggravate the 'numerical' manpower problem by adding to it a staff qualification

problem ... only /when the social and financial status of librarians and other information workers has improved/ can more people and especially those trained in a scientific or technical discipline be attracted to work in this field." The consequences of such a state of affairs are both quantitative and qualitative: not enough recruits will come forward, and those who do are likely to be of too low a calibre.

21. To these direct consequences may be added others of an indirect character. One has seen, for example, a situation in which a school of librarianship has been established at considerable expense in terms of resources and effort and is now turning out a modest number of Masters of Library Science each year. But instead of going on to strengthen the country's library and informtion provision, a good proportion of the students find that it pays them to go into other professions, e.g. the Civil Service, where the possession of a Master's degree (however irrelevant its subject to the job they will be doing) assures them of a far higher salary and status than would be accorded them if they entered the profession for which their M.L.S. had qualified them.

22. Such unfortunate and depressing situations could be multiplied and a case could be made for identifying inadequate salaries and status as a major obstacle to the development of a satisfactory library and information system in many countries of the developing world. It should always be remembered of course that this problem is neither new nor unique; over time it has loomed large in many now developed countries and the satisfactory state of affairs now to be found in the countries in question represents years, decades, sometimes even a century or more of struggling and fighting for recognition. The developing countries, of course, just cannot afford the time to fight these battles from beginning to end once again and a major objective for those concerned with library and information services must be to convince development planners of the benefits that accrue from an adequate investment of resources in these fields, and to do so with the maximum possible speed.

23. In the meantime, of course, the understandable temptation will be to accept for education and training candidates who are below - perhaps well below - the desirable level of educational attainment, personality and motivation. The implications of this for the curriculum followed by such candidates are considerable, particularly in terms of the methods adopted for teaching and the levels of student knowledge and understanding to which it is realistic to aspire. Planning must proceed on the basis that the calibre of students can be expected to rise with the passage of time, and once again it becomes apparent that the educational institution, its staff, and the curriculum to which it teaches, must above all be responsive to change and development.

24. Policy for overseas training. The level of qualifications to be awarded is obviously of central importance to those concerned with curriculum development and hence there arises the important question of national policy in regard to sending students for training overseas. Will the home training institution be expected to cover all levels of education and training - from the lowest professional level (or even subprofessional) up to Master's level, and perhaps the Doctorate? In practice, a fairly normal policy is for a country at the early stages of development to send those to be trained for leadership level - which usually means post-graduate (i.e. graduate) students - for training in a developed country. The advantages of this are obvious. Future professional leaders will be exposed overseas to a highly developed library and information infrastructure which will set high standards of provision and performance to which to aspire. It may furthermore prove possible for them to benefit from in-service attachments to one or more operational units, either as part of or as a follow-up to their course of studies. In addition, of course, they will have the direct benefits of following their professional studies

in a well-staffed, well-equipped and well-developed professional institution. It might then be argued that with such obvious advantages there would be a strong case, at the early stages in a country's development, for professional education at all levels to be carried out overseas. The normal answer to this - and it does not apply just to library and information studies - is that by growing up and being educated within the developing country's own educational system up to and including first degree level, a future professional will know at first hand the specific constraints and problems, not to mention the opportunities and challenges, which his own environment will provide. Too early exposure to a very highly developed environment may produce both frustration and unrealistic expectations on return from overseas. By the time the student has completed his studies to first degree level, however, this should no longer be the case: he can be expected to have the maturity to benefit from postgraduate study overseas without excessive danger of being unbalanced by it.

25. It may sometimes be possible to get the best of both worlds, for when a programme of study in an overseas institution calls for a dissertation, the student can be encouraged to choose a topic of special relevance or application to the problems of his own country. In appropriate cases it may even be possible for the student to return to his own country to collect the material for his dissertation, or to have a "sandwich year" (or shorter period) at home built into his course structure. Such arrangements are facilitated by the joint programmes and co-operative schemes which have been set up by many American - and other - schools, in association with educational institutions in developing countries.

26. In the early stages of a country's development, then, professional education for library and information work is likely to be carried on within that country at a level no higher than bachelor's degree; and, as stated earlier, the institution providing this education, even if it is a university, may also find itself providing training facilities for supportive staff at subprofessional level (and this group, it should be remembered, is an extremely important one in any library/information system). At these early stages the education and training operation must be very heavily oriented towards the special and distinctive library and information situation and needs of the country in question. As will emerge later, this should not be at the expense of a firm grounding in those principles of library and information science which have a general validity; but it does imply, for example, an approach to the study of management that makes sense in terms of local staffing levels and competencies, or an approach to the study of information sources which is realistic in terms of what the local infrastructure can provide. As that infrastructure progresses and develops, education and training objectives can and should change. When the local environment can provide its own examples of high-level library and information provision; when there are sufficient highly trained and experienced staff to provide an adequate teaching force; when there is a high degree of library and information self-sufficiency, with appropriate participation in regional and international networking arrangements; when these, and other essential prerequisites have been achieved, serious consideration can be given to extending education and training to the post-graduate level, with a corresponding diminution in dependence on institutions overseas. Until that time, however, the curriculum and methods of teaching may necessarily appear rather circumscribed in comparison with what is offered in the more developed countries.

III. FACTORS OF A SPECIFIC OR INSTITUTIONAL CHARACTER WHICH AFFECT EDUCATION AND TRAINING

27. In the previous section account was taken of various factors of a general character which affect education and training for library and information work. The present section concerns itself with more specific factors, often of an institutional character.

28. Financial support. There are many examples of educational and training programmes which with minimal financial resources produce work - and products - of an excellent quality. Conversely, the mere command of large financial resources does not in itself ensure good programmes. Nevertheless, the availability of funds for the provision of building, equipment and staff at an adequate level is obviously of central importance.

29. While library and information studies do not call for highly specialized and very expensive accommodation such as that required by a department of engineering, or chemistry, it is obviously of great benefit to the teaching programme if the accommodation can be tailor-made for its purpose. It is not unknown for governmental and non-governmental organizations, funds and foundations to provide the capital cost of a building and equipment for a developing country's school of library and information studies. In such cases, helped by the advice of appropriate specialists or consultants, it can be ensured that there is an adequate range of lecture rooms, seminar rooms for small group work, staff rooms, a library, rooms for specialized equipment such as audio-visual, computer peripherals and reprographics, laboratories for practical work in subjects such as classification and indexing, demonstration bibliographic and documentation systems and the like.

30. Expenditure does not of course cease with the purchase of a building and equipment. There will be a continuing commitment for maintenance and operation - which includes, of course, the services of technicians with the appropriate skills. Provision for this sort of recurrent expenditure is not normally included with external grants made for specific purchases, such as buildings or equipment, and it falls on the parent institution itself. The adequacy or otherwise of recurrent funds for this sort of purpose is central to the nature and effectiveness of the teaching methods adopted within the school, and is therefore another very powerful influence on the curriculum and its interpretation.

31. A financial consideration of a rather different character but likewise of very great importance is the availability of funds for assistantships and fellowships - i.e. the means by which carefully selected students can be given financial help while carrying out their studies.

32. Staff. The finest curriculum that can be produced is of little or no use if staff of the right calibre and in sufficient numbers is not available to teach it. The IFLA standards for library schools lay down one staff member for every 12 students. In Britain, the Library Association and the Council for National Academic Awards require one to ten. Schools with a strong research and advanced study orientation undoubtedly need staff/student ratios considerably in advance of these, if they are to function effectively.

33. A minimum of four - many would say six - full-time staff is required, regardless of student numbers, merely to provide for coverage of basic subjects. It is recognized that there will be situations in which these quantitative requirements are not met, but it must be emphasized that the poorer the level of staffing the more narrow and circumscribed must be the curriculum and the way in which it is taught.

34. Shortage - sometimes a complete absence - of qualified indigenous teachers has been a virtually universal feature of the beginning stages of professional education in the developing world. The normal solution to this problem has been to bring in expatriate teachers from developed countries, and the point must be made that, however excellent their qualifications, they are likely to need careful introduction to the special problems encountered in the developing world. They will often be on short-term contracts, perhaps of one or two years; sometimes, indeed, they may be available only for periods of a few months. This can and often does make for lack of

continuity in the interpretation and implementation of a syllabus, a problem which becomes even more marked when the stage is reached at which expatriates are phased out and newly-trained indigenous teachers take over. A constantly changing teacher force is, then, an important constraint for those charged with the responsibility of curriculum creation and development, a constraint which makes it essential that the meaning and scope of the terms used in a syllabus should be clear and unambiguous, and fully agreed and understood by those responsible for its teaching.

35. Any school of library or information science will gain in effectiveness if it can call upon the part-time services of experienced senior practitioners - either for the occasional lecture or for a whole course of lectures on their particular specializations. Such visiting lecturers are of course no substitute for a full-time staff of adequate size, but they complement full-time staff in a most valuable way. Their contribution moreover is not limited to expertise in their specialist professional topics; coming as they do, straight from a "live" operational unit, they bring a vigour and authenticity to their teaching which is much appreciated by students. Such teachers are likely to need training in educational methods, and integrating their contribution in such a way to ensure the essential balance and unity of the programme of instruction needs great skill, care - and, sometimes, tact - but effort so expended is richly returned in the possibility which it creates of extending the curriculum over a much wider range of topics than would be feasible if the teaching force were restricted to a small number of full-time staff.

36. Similarly, it will often prove possible to draw on the specialized skills available in other teaching departments within the library/information school's parent institution - lecturers in subjects such as statistics, computer applications, management. As already stated, access to staff of departments of this sort is an important advantage of a university environment. It is essential, however, that such lecturers should orient their contributions towards the applications of their subjects which are relevant to library/information needs and problems. Merely to repeat a course of pure statistics or computing science, such as they would present in their own departments is not enough. If the relevance of such subjects is to be appreciated by trainee librarians and information workers, examples and applications must be drawn from the library/information field. Again, the implication for those concerned with curriculum is clear: careful and detailed discussion with specialist lecturers from other departments is essential, to ensure that they fully understand the distinctive orientation that is required.

37. Part-time or full-time students. Turning from the teaching staff to the students themselves, a very important consideration is whether or not they will be following a full-time or part-time course of instruction. In general the former is to be preferred, though it must be recognized that it is not always feasible. A full-time course permits its component parts to be studied in parallel in a logical and carefully phased progression, so that the interaction and interconnectedness of subjects which for practical reasons may be taught separately, but are really parts of a unified whole, is made apparent to the students. Part-time students, on the other hand, will be studying the component parts of the curriculum in series rather than in parallel, which means that care must be taken in prescribing the order in which modules are studied: certain subjects will be essential prerequisites for the study of others. It also makes it important that the teacher should provide a general context for each self-contained module - makes it clear in fact that it is not likely to be self-contained for operational purposes, but is interactive and interdependent with subjects which are dealt with in other modules.

38. Though, as already stated, a full-time course of study is to be preferred, there can certainly be advantages to part-time study on which an alert teacher can capitalize to good effect. The part-time student will probably be spending a large

proportion of his time on operational duties which will illuminate and bring to life his theoretical studies; by the same token he will be able to view his daily work as a practitioner with a more critical eye and in the awareness, which his studies will be giving him, of a larger information/library context. Operational experience is in fact an essential element in professional education and training, and work in an operational unit - ideally for not less than a year - should precede a full-time course of study. If this is not feasible operational attachments of a few weeks at a time should be interspersed with the full-time theoretical part of the programme. In some situations an operational unit may even assume a full-scale training responsibility, and will work out a carefully integrated programme in which theory and practice can be blended to very good effect: INSDOC is, of course, a case in point.

39. Library and bookshop resources. In subjects as dynamic and as wide-ranging in scope as library and information studies, a large and well-stocked library is an indispensable requirement for effective teaching and learning. An impoverished collection limited to a relatively small number of books and specialist journals inevitably throws the emphasis on teaching, with every likelihood of a predominantly "chalk-and-talk" approach: the scope for "learning, by finding out for one's self" is of course strictly limited if the library is poor. Certain textbooks will be essential and should preferably be bought by the students themselves. Poor bookshop facilities, and the student's inability to afford the expense involved, may often make this difficult if not impossible, and in such situations a great responsibility is placed on the library to ensure that copies of key textbooks and other teaching materials are available in sufficient numbers to cover the needs of the student group.

40. It may be argued that library and bookshop facilities have only a marginal influence on the curriculum itself and that their impact is reflected primarily in methods of teaching. This is true up to a point, but it underlines the fact that the bare statement of a curriculum is only part of the total story: the really important considerations are qualitative - such matters as the calibre of the teachers, the methods they adopt, and - far from least - the richness of the library collections which support both teachers and taught.

41. Access to specialized equipment. Certain parts of the curriculum are directly dependent on the availability of specialized equipment. It would, for instance, be highly artificial if a curriculum included a component concerned with computerization without access to a computer and an appropriate range of peripheral equipment, preferably with the students being able to have actual "hands-on" experience of its operation. Similar observations apply to audio-visual hardware and software, to calculating machines and the like, as back-up for courses on non-book materials and quantitative methods, respectively. So important is this need for experience with equipment of all sorts - even including such relatively everyday things as typewriters and microform readers - that a strong case may be argued for making a "laboratory" an essential feature in any programme of professional education.

42. Again, it must also be emphasized that the equipment is not sufficient in itself: there must also be adequate resources of skilled technical manpower for maintenance purposes; in introducing students to the new technologies, nothing is worse for confidence and acceptability than a succession of problems due to machine failure.

43. Availability of operational units. Finally under this section concerned with factors of a specific and institutional character which affect education and training, reference must again be made to the importance, in any programme of studies, of periodical visits of observation to carefully selected operational units of all types.

The problem, of course, is that in many developing countries the number and variety of such units is strictly limited and the situation is, ironically, likely to be at its worst when the educational operation is new and struggling - since that will also be the stage at which the operational units themselves are new and struggling, and waiting for the qualified staff members who have yet to be produced by the library/information studies programme.

44. Another consequence of poor or insufficient operational units is, of course, their inadequacy as bases for pre-course or post-course practical experience. When this is the case it essentially means that the teaching institution, in addition to its primary task of imparting principles and theory, must also assume responsibility for a much larger "professional practice" responsibility than is the case in countries with a highly developed system of librarians and information units.

IV. EDUCATIONAL PROGRAMME POLICIES AND OBJECTIVES

45. General programme objectives. Previous sections have identified factors of a general and specific character of which account must be taken in planning educational and training programmes. Attention will now be turned to some general consideration concerning the programmes themselves.

46. If resources are to be used to maximum effect it is essential that programme objectives should be clearly and closely related to national - and in some cases, regional - needs. This stage of planning will be helped greatly if national or regional development plans are in existence. Such plans may indicate the nature and scale of the information, library, and related services projected for the future, with corresponding manpower estimates, but it will probably be for the educational institution itself to translate the latter into terms of specific levels and types of staff and training. In the total absence of a development plan, or of one which takes specific and adequate account of future library and information development and needs, it will be advisable to bring in outside expert assistance to carry out a survey and to draw up a plan which will take full and appropriate account of manpower requirements. If such outside assistance is not available it will be for the educational institution itself to make the best planning projections possible in the circumstances.

47. To the quantitative information produced by development plans and surveys those concerned with planning programmes must add their own professional assessment of the trends in library and information systems, services and technology which must be reflected and allowed for. In particular they must try to envisage the scale and nature of likely involvement in networking and resource-sharing developments of all kinds, and the consequent need for programmes and training that are compatible with what is being carried out elsewhere. It is often difficult at the early stages of development to envisage involvement and needs at this sort of level but Professor Adetowun Ogunsheye, in a paper presented at IFLA's 1977 Conference, gave the salutary reminder that Africa, for example, was brought into touch with the concept of regional documentation centres as long ago as the early 1960s - "quite early on in the history of information systems and networking".

48. Implicit in all of this is the acceptance by those responsible for professional education of a wider responsibility than merely producing practitioners for the situation as it is at present: a good professional school must also identify future professional trends and needs, and prepare practitioners to meet them. In other words it should lead the "field" rather than be a pale reflection of it. This point was well made by Professor Neelameghan in a paper to JNISIST's 1976 Ad Hoc Committee on Education and Training Policy and Programme, when he wrote of "Concern for the

future environment and tasks: changing the library image /to/ that of a system and network of systems in which information flows rather than as a building to which one has to go for information; changing the focus on library activity from that of a technique-centred to a user-centred and service-centred one; that many new media and carriers of information and dissemination would be used increasingly in the future ...". In pursuance of the same theme he also emphasizes the importance of the professional school's role in continuing education and the provision of advisory and consultancy services for the benefit of practitioners.

49. If one had to summarize all of this in one single word, then it would be "responsiveness" - responsiveness to changing user needs, to changing social needs, to changing professional possibilities and to changing technologies. Programmes must be hospitable and flexible enough to accommodate change; staff must be professionally aware and attuned to change and development both at home and overseas; and it may well be advisable to provide a formal mechanism for monitoring and taking account of change by instituting programme reviews on a regular and systematic basis.

50. At this point it may be useful to highlight an objective of a more specific nature: the need, in devising programmes, to bring out the essential and underlying unity of the various activities which contribute to the process of information transfer. More will be said on this subject at a later stage: at present suffice to say that programmes in developing countries must seek to eliminate rather than perpetuate artificial distinctions such as that between "information" and "library" type activities, which have been made in the past in many parts of the developed world.

51. Target groups. At the early stages of programme design a crucial policy decision is the identification of the type and level of personnel to whom the programme or programmes is to be directed. This in turn will depend on the needs of the library and information infrastructure which will be served. At an early stage in development the need is likely to be mainly for operational personnel, but as time goes by and the infrastructure develops and consolidates there will be a need for library and information managers - some of whom, at least, should be of top management calibre and correspondingly high-level training; for research, development and design personnel; for a range of professional operational personnel, with sub-professional and other supportive staff - from technicians to key-punch operators; and for ancillary specialists such as information analysts and computer specialists.

52. It may be many years before a developing country can provide from its own resources adequate training facilities for such a wide range of requirements. The important thing is to start with a programme which is realistic in terms of available resources - particularly resources of skilled teaching personnel - and to plan for overseas training to meet the more advanced and sophisticated requirements. Initially it may not be feasible to cater in the home country for more than a lower professional or even a sub-professional programme; as experience is gained and resources improve this can be extended and the balance will move towards more home-based and less overseas training. The important thing is to be quite clear, at any point in time, about which programmes it is desirable and feasible to present in the home country, and to plan accordingly. The relating of different types and levels of training and qualification to particular objectives will be considered more fully in Section V below.

53. Training for early responsibility. In concluding this section attention must be drawn to a very important feature of education and training for the needs of a developing country. In the early stages of development there is likely to be

virtually no pool of trained professional manpower on which to draw when creating and building up the component parts of the nation's information infrastucture. For some years, therefore, it is likely that newly qualified entrants to the profession will be very quickly thrust into positions of far greater responsibility than would be the case in the developed world. This fact underlines the need for training programmes to emphasize self-reliance and initiative and to encourage an inquiring, analytical, problem-solving approach to teaching and learning. It also follows that programmes should give strong emphasis to the study of management: again, more so than might be necessary in a developed country, where the acquisition of management skills can take place more slowly, on the job, and with the help of participation in post-qualification courses of a specialized nature.

V. LEVELS OF PROGRAMME

54. It is not easy to write in general terms about levels of programmes, since the structure of the educational system in different parts of the world varies considerably and results in different types of higher educational institutions and different designations for the qualifications which they award. In Denmark and Norway, for example, the schools of librarianship are not within the university but are specialized institutions devoted to library and information studies, offering programmes of three or four years duration, and requiring of those who are admitted the same high level of entrance qualifications as are called for by the universities. On the other hand, it is the university framework as described in paragraphs 12 to 16 which is most common the world over, and certainly in developing countries. For this reason the matter of levels will be dealt with on the assumption that the universities will be playing the major role in professional education for information studies. Clearly, however, it must always be kept in mind that there are other approaches, such as that in Norway and Denmark, described above, which may be more appropriate to certain higher educational systems.

55. Keeping the above considerations in mind, then, the basic programmes of education and training which are the concern of these guidelines can be presented in three principal forms:

(a) non-graduate professional;

(b) undergraduate;

(c) post-graduate, or (in North-American terms) graduate.

56. All three types of programme have their distinctive characteristics, which will be discussed shortly, but all share one common objective: that of equipping students with a basic knowledge of the whole spectrum of library and information work. After the successful completion of such a programme and a reasonable period of on-the-job induction, a student should be capable of quickly becoming a productive and effective staff member of any type of library or information unit. The scope and range of all three types of programme is therefore broadly the same; the difference between them is in level of treatment and in level (and therefore status) of the qualification which is awarded. In this connection it is extremely important that a ladder of educational opportunity should exist by which those with appropriate aptitudes, abilities and motivation may proceed from one level to the next. This principle also applies to the level below the three now being considered, for any sub-professional programmes of the aide/technician type should be of such a standard and content that their successful completion at an appropriate level will be acceptable for entrance to the non-graduate professional programme.

57. (a) Non-graduate professional programmes. It is common to find this level of programme existing side by side with the other two levels: this is the case, for example, in the United Kingdom and in a number of countries in the developing world. For a useful discussion of the situation in West Africa the reader is referred to an article by Adetunji Akinyoto: A comparative study of education for librarianship in West Africa. Int. Libr. Rev. (1976) 8, 493-513. These non-graduate programmes are likely to be of two years' duration and, unlike many of the undergraduate programmes, are normally given over exclusively to professional topics, with no academic component of a non-professional character. The graduates of such programmes will normally be concerned with operational activities - with the actual running of the country's information systems - and it is from this category that the majority of middle-level operational staff are likely to be provided. The range and scope of the curriculum covered should be as recommended in Section VI, except that area (f), the dissertation of special study may be omitted. The treatment and interpretation of the curriculum topics should show a strong practical emphasis.

58. Admission requirements should preferably be the same as the lower end of minimum university entrance requirements but if this is unrealistic, as it well may be in some countries, the requirement should be pitched as near that level as possible. The general trend in a developing country is towards an ever increasing number of young people receiving secondary school education and emerging at or near to university entrance level and it would have serious long-term consequences if information studies were content to admit students from too low a point on the educational achievement spectrum. This does not of course invalidate the point made earlier that suitably high-level achievement on a sub-professional programme may provide an alternative route to admission to a non-graduate professional programme; in such cases it is sensible and reasonable to require in addition a minimum period of approved and successful operational experience.

59. This is perhaps the point at which to mention a problem encountered in many developing countries - that of the inadequate general educational and cultural background of many of the "first generation" students who come forward for professional training. A solution which has been adopted in a number of French-speaking countries will merit serious consideration in such cases. It is to incorporate into the curriculum a group of subjects - up to a third - known as "culture générale". Alternatively a preparatory, pre-professional year of general studies may be required - as was the case for instance at a certain stage in the development of the East African School of Librarianship.

60. Finally, the point must be made that experience in many parts of the world has shown that undesirably low status has often been attached to a professional qualification which is not at graduate level. Those responsible for creating programmes should therefore give very careful consideration to the possible adverse consequences which may follow in the long term if the decision is made to pitch the programme at non-graduate level. It is recognized of course that in many situations there may well be no practicable alternative.

61. (b) Undergraduate programmes. For the purpose of these guidelines an undergraduate programme is taken to mean something very much more substantial than the offering of a few librarianship subjects at a "minor" level, which is a common North-American connotation. An undergraduate programme which comprises a basic course in the sense of these guidelines means a three-year, perhaps even a four-year, programme, in which the major element is the professional librarianship/information content. In addition, one or more traditional academic subjects are likely to be studied. Though it is not to be expected that the choice of these academic subjects will always be within the control of those responsible for the professional component, it is worth making the point that certain subjects are particularly valuable for

future information workers. Languages are of course very important, especially those in which the bulk of the world's literature appears, i.e. English, French, German, Russian and Spanish. There are also certain academic subjects which are of special importance for one or more main areas of the information field. These include mathematics, statistics, computing science, linguistics, sociology and psychology.

62. There is controversy in many parts of the world about the whole concept of undergraduate programmes for library and information studies. The points against this approach include the argument that bachelor's level programmes should not be vocational - that it implies taking decisions about a future career at too early a stage: and that the predominating vocational component is at the expense of the "liberal arts" or specialized subject knowledge that is of particular importance to information practitioners. For this reason, it is argued that professional education should follow study at bachelor's level in a traditional academic subject, i.e. should take place at the post-graduate stage. There is of course substance in this argument but it must be recognized that in some developing countries, particularly at the early stages in development, it is not easy to recruit at post-graduate level and that it is easier to attract potential recruits to the profession by offering programmes at undergraduate level. There are also certain advantages deriving from the longer duration of an undergraduate programme, not least being the possibilities which are afforded by a three-year period of study for gaining in-service experience of information work during vacations. The simultaneous study of both academic and professional subjects should also offer possibilities for project and practical work which will bring out important relationships in a meaningful way, e.g. the linking of the study of sociology and of information sources for the social sciences, or of linguistics and of indexing languages.

63. A sound undergraduate programme should certainly provide good recruits for the upper levels of operational activity in library and information work and also for potential middle-management levels. For top management posts or for research and development work, further, more advanced training will be required at the appropriate stage in the candidate's career. It must also be realized that the standard to which a student on an undergraduate professional programme will have studied the subjects which form that programme's academic component will necessarily be considerably lower than is achieved by a student whose programme is restricted to the specialized study of a traditional academic discipline or disciplines. This will mean that undergraduate programmes cannot be expected to produce future subject specialists: for these the profession must turn to recruitment at the post-graduate level, which is considered below.

64. Entrance requirements should be the same as for any other undergraduate programmes within the institution in question. The academic calibre of those following the programme should therefore be such as to permit a more rigorous treatment of the seven areas of study set out in Sections VI and VII below, than is reasonable or desirable at non-graduate professional level. The general approach should therefore be less practical and place more emphasis on theory and principles - which is not of course the same thing as saying that there should be fewer practical exercises: the three or four years' duration of the programme should provide ample opportunity for work of this latter type.

65. Again, the point must be made that in accordance with the principle of offering a "ladder" of educational opportunity it should be possible for certain candidates to be admitted to the programme on the basis of appropriately high achievement in the non-graduate professional programme, plus an acceptable level of operational experience.

66. (c) Post-graduate or (in North-American terms) graduate programmes. The point must first be made that post-graduate programmes can take a number of forms. They can, for example, comprise a programme of research, leading to a Master's thesis; or they may require specialized and advanced study, not of a wide range of "basic" subjects, but of a limited number of professional topics, resulting in course work and, perhaps, a dissertation. In both cases the normal assumption would be that the student already had a basic professional qualification and a fair amount of operational experience. The concern of these guidelines is, of course, not with programmes of this type, but with basic courses of study, which at post-graduate level will normally imply a programme of an academic or calendar year in duration, following graduation in a traditional academic subject or subjects. Since this means a highly compressed course of study it is very desirable that students should have had a period of operational experience - preferably not less than a year - between graduation and commencing the programme, for it will not be feasible to build such experience into the programme itself. It should, perhaps, be added that although it is rarely practicable, the duration of the course of study should ideally be two years rather than one.

67. The closest existing comparisons with this type of programme are afforded by such qualifications as the North American M.L.S., the Brazilian M.S., or the British Post-graduate Diploma. The designation chosen will depend on the educational system and practices of the country in question, but if possible it is preferable to use the designation post-graduate diploma for the basic programme, reserving the title of "Master" for programmes of a more advanced nature.

68. It will of course be realized that though "post-graduate" in chronological terms, the programme will be breaking new ground for most of the students who follow it, and will not be extending and deepening knowledge of subjects which they have studied at undergraduate level. The programme will be very intensive, but the educational and personal maturity of the students should permit a much more advanced level of treatment than is feasible at undergraduate level. With so much ground to cover in such a short time elaborate detail should be eschewed and the main emphasis should be on theory and principles. Full advantage should also be taken of the students' expertise in their specialist academic subjects: these may be built upon to very good purpose in certain areas, particularly area (c), source of information, and in area (d), information/data storage and retrieval. (See Sections VI and VII below.)

69. When the time available for the programme is only an academic year and not a calendar year, there may be grounds for dispensing with area (f), the special study or dissertation, but it is highly desirable that some such component be retained, even if pressure of time requires it to be reduced to the status of an extended essay or project. This apart, the range of studies should be as set out in Sections VI and VII below; and though, as already stated, a strong emphasis should be placed on principles and theory, this should not be at the expense of the practical exercises recommended for the various areas.

70. From the students who follow post-graduate programmes are likely to emerge most of the professional leaders, the subject specialists, the managers, and those who will carry out the profession's R&D work. Entrance requirements should therefore aspire to as high a level of academic attainment at first-degree level as can realistically be demanded, and in addition should require interviewing and assessment for suitability for information work in terms of personality characteristics and general motivation. (This of course applies to all recruits to the profession, not just those at post-graduate level.)

71. The "educational ladder" principle will not apply in the normal way to this particular qualification, for a basic one year post-graduate programme does not provide a natural progression from the three- (or four-) year undergraduate programme. It is recommended that the "ladder" for students with an undergraduate professional qualification should lead straight to the Master's degree by thesis or by advanced course work and dissertation, as described earlier in this section.

72. Continuing education. The concern of this section has been with the principal types of basic programme. It is worth making the point, however, that in these times of rapid professional and technological change a basic course of study does not last for life. It must be complemented by programmes of continuing education which have the role of "up-dating", of giving scope for specialized study in greater depth than is feasible on a basic programme, and of introducing and disseminating new developments. In developing countries the institutions which offer basic courses have perhaps an even greater responsibility for such continuing education than is the case in developed countries, for in the latter there is normally a wider range of agencies - e.g. mature and well-established professional associations - which are capable of mounting such programmes.

VI. CURRICULUM CONTENT

73. General. Consideration has already been given to programme policies and objectives of a general character, to the matter of target groups, and to the variety of levels and types of programme, together with their distinctive characteristics. In the present section attention will be turned to the content and component parts of an information curriculum, but before doing so it is necessary to be clear about a number of important matters which should influence the whole approach to creating and developing the curriculum.

74. First of all it must be kept in mind that a professional education is different in some important respects from an academic education. Certainly it includes a strong academic component, especially that which is concerned with the principles and theory which underpin the profession in question; but professional education is by definition vocational and should therefore normally include a practical component, and allow for the acquisition of the skills which are relevant to the profession in question. In the case of the library and information professions this sort of requirement is exemplified by such activities as the practice of information and reference work, classification, indexing, interaction with computer-based information services, and the like. For this reason, it is the responsibility of the educational institution not only to ensure that the student has a full grasp of the principles and theory which underlie all of these activities, but to provide very carefully selected practical exercises to illuminate them. It is, however, neither feasible nor desirable to attempt to impart in the classroom or laboratory a degree of expertise that can only realistically be acquired by live, on-the-job experience. For this part of a student's professional equipment the principal responsibility must be assumed by the operational unit or units in which he gains his practical experience before, possibly during, and certainly immediately after, his formal course of education. A full professional education, in fact, should be seen as a partnership between the world of practice and the world of education, with each having its own distinctive contribution to make. It is of course not always possible to formalize such co-operation, but its value is great indeed, and is testified, for example, by the (British) Library Association's requirement that admission to its professional register requires not only success in the examination room but the completion of three years of approved practical experience.

75. The second matter which must be made clear before giving detailed consideration to curriculum content is that these guidelines are not intended to provide or to facilitate a "cook book" approach to curriculum creation and developments: the problems to be faced are much too complex for such an approach to be feasible. There is, for one thing, the problem presented by the lack of a standardized and agreed terminology. This may be seen in the wide differences between individual institutions in their view of the scope and content of subjects to which they give the same name; or of the different names which they give to subjects which would appear to be identical. Some impression of the nature and scale of this problem for the information sciences as a whole can be gained from an examination of the curricula set out in Foskett's NATIS: Preliminary survey of Education and Training Programmes at University Level in Information and Library Science(3), where the 58 programmes which are considered produce between them several hundred course titles - all no doubt perfectly valid and justifiable in the eyes of the institutions in question but in many cases covering, under different course titles and designations, virtually identical ground.

76. Even in the case of subjects where there is agreement about designation and scope there will often remain the problem of differences of interpretation and depth of treatment which reflect the viewpoint - or limitations - of the individual teacher or the institution itself. Such differences are often so great as to make the title or designation of a course near to valueless as a description of what in fact happens in the lecture room. And finally, it must always be kept in mind that the courses on offer within any institution will often reflect not so much the logical breakdown of the subject or subjects in question as the exigencies of the institution's organization and structure; for example, what will fit into a term, a sezester, a quarter; or the amount that can be covered in a certain number of credit hours. Similarly, any individual programme is less likely to reflect an ideal combination and balance of topics than one which is dictated by the particular skills and specializations of the staff available at that particular point in time.

77. For these reasons - and many others - an approach to curriculum development which depends too heavily on listings of course offerings from existing institutions - however excellent - has severe limitations. It is both dangerous and misleading to copy or to be overly influenced by the programme of another institution without a very full awareness of its distinctive objectives and characteristics, its constraints, its special opportunities. For the same reasons it would be relatively valueless - indeed, presumptuous - to attempt to prescribe in these guidelines a definitive curriculum; the "cook book" approach, as already stated, is quite inappropriate for our purpose. What is needed is an approach to curriculum development which can be adjusted to the particular needs of a particular situation, which will be adaptable and flexible, to meet changing needs. It is not claimed that these guidelines can produce a final or completely satisfactory methodology for this purpose, but careful consideration of the scope and range of the subject, as set out in paragraphs 80 to 106 below, will provide signposts to the appropriate curriculum components.

78. Sources. Before this stage is reached, however, an essential first step for anyone engaged in serious work on curriculum development in information studies should be the careful study of two very valuable works on the subject which have appeared in recent years. First of all, there is H. Schur Education and Training of Information Specialists for the 1970s(1). This analyses in considerable detail the programmes of leading North American and European schools, sets out a range of recommended programmes and programme components, and gives valuable scope notes in respect of each topic. Its terminology has a scientific and "information" rather than a traditional "librarianship" orientation, but this should prove no obstacle to the normal reader. Secondly, there is D.J. Foskett, NATIS: Preliminary Survey of Education and Training Programme at University Level in Information Science. Paris(3).

This is based on an F.I.D. sponsored survey of education and training programmes in 13 countries and provides a full and valuable analysis of the programmes of 58 different institutions. A useful feature of this publication is a description of the education and training situation in each individual country. This brings out very clearly the difference between the various national educational systems and the great variety of objectives and approaches which characterize educational, social and political environments of a widely different character. Comparison of these descriptions with the situation in his own country should normally provide helpful pointers for anyone charged with the responsibility of planning an educational programme. Another useful feature of this publication is the categorization of curricula into theoretically oriented, computer science oriented, library oriented, and systems oriented, with examples of each type of approach; again, this should prove very helpful to someone at the early stages of policy-making in respect of curriculum creation and development.

79. In addition to the two publications just described, which are of very special importance, reference should also be made to J. Dean, Planning Library Education Programmes, Deutsch, 1972. This work is particularly concerned with developing countries and includes a useful section on curriculum. It will also be very well worth while to study the programmes produced by particular institutions, organizations or individuals, though the warning must be repeated that such cases should not be studied in isolation: full account should be taken of the total context in which they have been produced. Some good examples are the following: Mexico. National Council for Science and Technology (CONACYT). Proposed Curriculum for Graduate Library Education Program. September 1976. This includes some very useful course outlines. A programme especially created for the Philippines, which has not only contents notes for a whole range of subjects, but also time allocations, is to be found in H. Grünewald Special Training Programme for Information Specialists(4). INSDOC Training Course in Documentation and Reprography. Progress Report, 1964-1975, New Delhi will also repay study and is particularly useful in providing a full context and some historical perspective. P. Havard Williams and E. G. Franz Planning Information Manpower. Paris, Unesco, 1974 (document COM-74/NATIS/Ref.5) is an important document which emerged from the seminal 1974 Intergovernmental Conference on the Planning of National Documentation, Library and Archives Infrastructures. As is implied, it takes account not only of information science and librarianship but also of archives, and attempts to identify a common core for all of them. Another important Unesco source is the chapter on education and training in Pauline Atherton's Handbook for Information Systems and Services, Paris, Unesco, 1977. A key document from another international source is IFLA, Standards for Library Schools(5) which includes a substantial section on curriculum. For the important work which has been carried out in the USSR during recent years, reference should be made to Nauchno Tekhnicheskaya Informatsiya for the period 1974-1977. H-P. Geh, Current Problems in Library Training with a Proposal for a Curriculum, Libri, Vol. 24, 2, 197, will also repay careful study, and a major piece of work with special value for Africa is Dr. Dorothy Obi's Ph.D. thesis entitled The Curriculum Needs of the Sub-Saharan African Library School: A Study in Comparative Education for Librarianship. As a final example, reference should be made to Professor V. Slamecka's A University Department of Information Science: Some Design Guidelines. This is a discussion paper prepared for the United States-Egyptian Workshop on Planning a National STI System, Cairo, 1975, and it includes an outline of the "domain of knowledge" relevant to education in applied information science.

80. Scope and range of information studies. In simple and very general terms the concern of information studies is with the transfer of knowledge, or information, or imaginative simuli from one human mind to another. This statement begs many questions of definition and ignores many of the subtleties which emerge from the

fascinating and important discussions which abound in the theoretical literature of the field, but for the present purpose it provides an adequate indication of the bounds within which curriculum creation and development should be considered. Careful examination of the publications identified in the previous paragraph will give some indication of the variety of topics which can legitimately be covered by an information studies curriculum and of the large number of possible approaches. To pick a way through these many alternatives is no easy matter and it must be emphasized once again that there is no definitive, "all-purpose" answer. It is possible, however, to approach our subject in such a way that the principal areas of study which collectively make up information studies will emerge, and provide a structure upon which a curriculum may be built. These areas comprise the following:

(a) human communication: a foundation course;

(b) user studies;

(c) sources of information;

(d) information/data storage and retrieval;

(e) organizational aspects;

(f) dissertation;

(g) electives.

In Section VII, each of these areas will be expanded in terms of specific courses; but first, the scope and rationale of each of them will be discussed in general terms.

81. (a) Human communication: a foundation course. This first area of study is concerned with a general overview of human communication - of what is involved in "the transfer of knowledge, or information, or imaginative stimuli from one human mind to another". It will provide a context, or foundation for the more specialized areas which will follow.

82. Human communication, for this particular purpose, can be thought of from two points of view: theoretical and practical. For the theoretical component it is recommended that the scope note in Schur's Education and Training of Information Specialists[1] be followed. He itemizes the senses; the brain; cognition; recognition; memory; learning; signs, language, signals, codes; oral, written and other means of human communication. In a basic course it will not normally be necessary or appropriate to aspire to any great depth in the treatment of these subjects but it will be noted that Schur's definition provides the opportunity to study information science at a theoretical level and to as great a depth as may be feasible or appropriate. This section of the syllabus will also afford the opportunity to study the important matter of the relationship between information science and various cognate disciplines, a relationship which is in a continuous state of change as information science itself develops.

83. The practical component provides the means by which the communication process may be considered in more tangible terms. "Information" can be presented from the point of view of its genesis, or generation, its preservation, storage, retrieval and utilization. These aspects can be translated and presented in terms of the activities, mechanisms and institutions which collectively encompass the whole process of information transfer: for example publishing, libraries and documentation

units, information services, classification and indexing, resource sharing, and the like. This general overview, in its turn, will provide a natural lead-in for consideration of the total library and information infrastructure at national, regional and international level. Again, the object will not be to consider any particular aspect in great depth, but rather to provide a general context within which the role and activities of any individual information worker or any institution, however specialized, can be viewed. It is of great importance that from the beginning the information specialist should think of himself and his activities not in isolation, but as a link in the total communication chain; that he should see information resources in global rather than parochial terms; and that he should move naturally into an approach which takes full account of - and extracts maximum benefit from - resource-sharing and networking arrangements. In this connection it will be apparent that this first, foundation area of study will afford an appropriate opportunity for introducing students, at a very early stage, to the UNISIST programme and the NATIS concept.

84. (b) User studies. Having established through the foundation course a general context for further, more detailed study, it is appropriate to proceed to the second area - a consideration of user studies. It is now generally accepted that the "client", the user, should be the focus, the starting point, for any systematic approach to information studies; and that programmes of education and training should be characterized by a strong user orientation. This particular section will therefore give scope for the study of the user from a number of different points of view.

85. At an early stage it will be important to bring out those differences in library and information user needs which depend on geography, stage of development, social, economic and political structure, and national culture: for example, the difference in attitude towards recreational reading in a newly-developing tropical country, where the culture is transmitted largely by oral means, from that of a European country in a temperate zone, with centuries of literary tradition behind it; or the differences in the information needs of a predominantly village-based working population, whose major concern is agriculture, from those of a highly urbanized industrial population. Consideration of factors of this sort will very quickly demonstrate the need to approach a country's library and information provision via an assessment of its own, distinctive needs, and not by the wholesale transplanting of practices and systems from environments of a very different character.

86. A second and likewise very important element in user study is the consideration of the distinctive library and information using behaviour and needs of specialized groups, for example individual professions and specialized disciplines. This should be extended further to a consideration of those differences which reflect the character and objectives of different environments: for example industry as compared to the academic world or government. It is recommended that as broad a coverage as possible should be attempted for all students but that this should be supplemented by in-depth study of one or more particular groups or working environments. Experience has shown that for a really meaningful approach to the study of the user it is not sufficient to draw on the very extensive corpus of recorded user studies: it will also be necessary to give some attention to the nature of the discipline or specialized activity that is being studied. The difference in methods of study of humanists and scientists, for example, has quite profound implications for library and information provision; the pressures and objectives of the industrial environment make the information needs and information-using behaviour of an industrial chemist significantly different from those of his academic counterpart.

87. In studying user needs and user behaviour the student will inevitably be exposed to the findings of surveys of need and surveys of use. These are mainly presented in quantitative form, which underlines the need for present-day library and information workers to be numerate as well as literate. There is a strong case for requiring all potential library and information workers to have at least a general grasp of surveying techniques, if only to enable them to assess and monitor the needs of users of systems for which they themselves may be responsible. Such knowledge is best gained not in isolation but as part of a general course in quantitative methods, as referred to in paragraphs 104 and 119 below.

88. (c) Sources of information. This third area of study is concerned with the means by which the needs identified in area two, above, are satisfied. There was a time when the curriculum for this area took a narrowly bibliographical approach, and the principal requirement of the student was that he should have a fairly detailed knowledge of major bibliographical and reference works. For present-day purposes it is necessary to recognize that sources of information are not limited to the documentary but include, for example, audio-visual materials and computer data bases; and that, furthermore, though many of these data bases provide bibliographical information, there are others which are numerical in character. A further, and very important dimension is provided by the recognition that many valuable sources of information are neither documentary nor computer based, but personal: that a good deal of information work depends on knowing not just what to consult but who, or which institution to consult.

89. For curriculum and teaching purposes the most fruitful approach to this area of study will normally be via groups of disciplines: science and technology, social sciences, and humanities. It is desirable that all students should be exposed to an overview which will consider all three groups, together with sources of a general or pervasive nature. Though necessarily superficial such an overview should bring out the distinctive character of various types of information source and lead naturally to a consideration of the general principles of bibliographical control and collection building. This general study of information sources should be supplemented by the study in depth of the information sources available to a particular discipline or group of disciplines - not so much with a view to an exhaustive and detailed knowledge of the sources in question, but rather with the objective of identifying and extracting a methodology which may often be applicable to information work in other, related disciplines.

90. This is a field of study in which a practical component is extremely important. Carefully devised practical exercises requiring a systematic approach to the pursuit of information and the actual handling and utilization of information sources are essential. These should be so designed as to bring out the reference and search strategies appropriate to all the principal fields of knowledge. If resources permit, such exercises should also involve the student in actual "hands-on" experience of interaction with computer data bases.

91. Related to practical reference and information work is the preparation of analytic literature reviews, and, indeed, the whole subject of presentation and dissemination of information, both in bibliographical and narrative form. There are, of course, other aspects of this subject - for example those which will be covered under reprographics, in area (e) - but this present area is the one in which it is likely to be most appropriate and convenient to carry out the relevant practical work in presentation and dissemination of information.

91(a) It will be apparent that there is a certain parallelism between what is studied in this area and what is studied in area (b): for example user behaviour and needs in the social sciences and sources of social science information. For

this reason there are obvious advantages in so phasing the teaching programme that related topics in each area are studied at the same time. It must of course be accepted that this will not usually be possible for part-time students who are likely to be approaching their studies module by module.

92. (d) Information/data storage and retrieval. As its name implies this area of study is concerned with the means by which information workers organize information and data for storage and subsequent retrieval and use. In the past it has often been designated the organization of knowledge and it is in fact a subject with a very substantial theoretical base. Its more practical manifestations are seen in the long-established activities of cataloguing, classification and indexing, and the emphasis until recent years has been primarily on bibliographical classification schemes and codified approaches to cataloguing. The importance of the latter is diminishing as access to centralized sources of cataloguing data becomes more widespread; and the study of indexing systems, with increasing emphasis on faceted principles of classifying for retrieval has tended to rival, if not supplant, the study of bibliographic classification schemes.

93. Whatever the emphasis selected for a particular situation the study of this area must be solidly based on the fundamental principles of classification, indexing and cataloguing and, at an appropriate stage, the student should be led to the critical examination, analysis and evaluation of performance of retrieval systems.

94. In addition to a strong emphasis on theory, the study of information storage and retrieval calls for a very substantial practical component. Carefully selected exercises in relevant cataloguing and classification systems, the major aim of which should be to bring out important principles, should be carried out by all students. These should be related above all to the actual practices and needs of the countries and institutions which the students are being trained to serve. The emphasis on principles is important: as already made clear it is neither desirable nor feasible for the training institution to aspire to produce fully trained cataloguers and classifiers: this sort of expertise comes only with lengthy experience on the job, in actual operational situations. In addition to practical work on classification and cataloguing it is now widely accepted that for a proper understanding of modern approaches to information storage and retrieval it is beneficial for students actually to construct a faceted scheme for a particular topic and to carry out exercises in thesaurus construction.

95. An important component in the study of information storage and retrieval is the study of computer methods, though it is recognized that in some developing countries the realities are such that computerized services are still some way off. Nevertheless, all students should be expected to attain a basic understanding of the computer, its limitations, and its potential in information and data storage and retrieval, and this should be exemplified by the study of selected computer-based information/data systems. If resources permit there should also be a practical component to this study: the construction and running of an elementary programme.

96. The point needs to be made that a knowledge of computer basics, as required for this course, is also necessary for the study of library automation, as set out in (e), paragraphs 103 and 119 below. In practice, therefore, there must be a certain amount of integration between these courses, though it is convenient at this stage and for the present purpose to consider them under two different areas of study.

97. (e) Organizational aspects. In previous areas of study the emphasis has been primarily non-institutional, i.e. on the more general aspects of information transfer and the communication process. In this present area we turn to implementation, to

the realities of creating and operating the various units which together make up the total information infrastructure. For a full understanding of the role and operation of an individual unit, it is first of all essential that the student should be able to see it in both a national and an international context, and this area of study should therefore include systematic coverage of the national and international library and information network. This will, of course, build from the introductory, basic presentation of this theme which commenced in area (a).

98. The most substantial component in this area, however, will be provided by a thorough study of management principles and techniques which, as already stated, is a subject of particular importance for students from developing countries. There is a substantial and well-defined core to this subject which is of general application, and not peculiar to the information field, but it will be necessary for the information studies student to go beyond this. He will need to give special attention to the varied types of environment and objectives which characterize different types of library and information operation. This will require him to be aware of the distinctive operational, constitutional, legal, political and other constraints within which, for example, a public library operates, as compared with those to which the library of a university or the information department of a research institute is subjected. Since it is likely that few students will know until they complete their training exactly what type of unit they will be working in it is recommended that the whole spectrum of library and information activity should be studied from this point of view though necessarily at a general level. There should, however, be an opportunity to study one particular sector in greater depth. For this purpose the three principal types - academic, public and special - provide a framework which will accommodate the detailed study of virtually any type of operational unit.

99. This same framework will also provide the means by which more detailed study may be made of what is involved in the actual operation of library and information systems. These operational aspects will of course have been covered in general terms by the study of management principles and techniques, but they are sharpened and illuminated when considered in relation to one particular type of unit. Useful guidance to what is required is to be found in Schur's[1] scope note 4.5 ISR system operation which includes methods and procedures; functions and structure of the system; operational problems of ISR subsystems, output, input, processing and storage, feedback, control; problems of equipment, accommodation, staff, data base, methods; operational targets; staff, operational and financial control; evaluation; effectiveness, efficiency.

100. It will be observed that this offers a framework which can accommodate study in varying degrees of depth and detail. It will cover for example the different ways in which a unit may be organized and the staff deployed for maximum operational effectiveness, but if necessary this could be taken a step further and detailed attention be given, for example, to the organization and staff utilization of specialized departments - for example, technical services or the information department.

101. At a different level, this framework for considering actual operational requirements and activities gives scope for the study of reprographics and the binding and preservation of documentary materials. The former is of such universal importance that it should be required of all students; the latter is of particular significance in tropical environments, but its degree of coverage - as with many topics with an operational orientation - should depend on local circumstances and requirements.

102. Finally, reference must be made to two further topics which belong to this general area of study: automation and quantitative methods.

103. Automation. The concern of this topic is with the application of basic principles of systems analysis and design to automatic data processing in libraries and information units. The "housekeeping" areas of principal concern are acquisitions, serials, cataloguing and circulation, and the critical reviewing of existing automated systems should be supplemented, if possible, by demonstrations of actual operational systems. As already stated, the study of computer basics which is a prerequisite for this course provides common ground with the study of computer methods for information storage and retrieval.

104. Quantitative methods. Effective management is heavily dependent on a continuous flow of information of a statistical or quantitative character; this provides a basis not only for monitoring current operations and activities but for forward planning. It is therefore important that information managers should know enough about surveying techniques and statistical methods to be able to set up appropriate systems for collecting the necessary information and, having collected it, to be able to interpret it correctly as a basis for future action. Knowledge at a fairly elementary level is all that is required for most operational purposes and the emphasis of the course of study should be essentially practical. Concern should be less with the niceties of statistical technique than with demonstrating their relevance to library and information work and drawing on as wide a range of practical examples as possible.

105. (f) A special study or dissertation. The range of a basic course is such that most topics have necessarily to be dealt with at a general, even at times a superficial, level. It is therefore advisable that some part of the course should afford the student an opportunity to study a topic of particular interest to him in considerable depth. This can be achieved by a requirement for a special study or dissertation which will involve the student in the preparation and presentation of a substantial piece of work. If the topic is carefully chosen and if the supervisor ensures that the student's approach is appropriately rigorous, preparing the piece of work should afford the student a small-scale experience of the discipline and requirements of research, in addition to the satisfaction of covering at least one topic in considerable depth.

106. (g) Electives. Section K, curriculum, in IFLA Standards for Library Schools(5) commences with the statement that "The curriculum should consist of a unified series of courses and other educational experiences, designed to meet specific program objectives... All students should study certain fundamental 'core' subjects as well as more specialized electives". The nature of this "core", as perceived in these guidelines, emerges from areas (a) to (e), as described in paragraphs 81 to 104 above. It is believed that the study of all of these areas is essential for a basic course and it is clear that they cover between them such a very extensive range of topics that the scope for the inclusion of electives will be strictly limited. Nevertheless, the advantages which result from studying a specialized topic in considerable depth - which is the purpose of an "elective" - justify the inclusion of at least one elective in a course of study, and in some situations it may even be decided that a second elective is sufficiently important to justify its replacing the special study or dissertation. The range and nature of the electives which are offered will of course largely depend on practical considerations such as the special capabilities of the staff of the teaching institution or the availability of specialist visiting lecturers, or lecturers from other, cognate departments. Above all, of course, the range of electives should try to reflect as faithfully as possible the particular needs of the country or region for which students are being trained.

VII. COURSE COMPONENTS

107. In the previous section consideration was given to the scope and objectives of the seven areas or courses of study which collectively make up a basic programme in information studies. In this present section the specific components which make up each course or area will be designated. These should be read and used in combination with Section VI, and for further amplification the reader is referred to the publications mentioned in paragraphs 78 to 79, and particularly to the works by Schur and Foskett. Relevant extracts from the former publication in which a whole range of curricula are analysed, are produced in the Appendix.

108. The point has already been made that although it is convenient and sensible for teaching purposes to divide the curriculum into well-defined and distinct areas of study, there is an interconnectedness between these various areas. The student should be constantly made aware of this and it is naturally much easier to achieve this objective if he is studying full time. It is then possible to arrange the phasing and timing of the study of individual areas and topics in such a way as to bring out interrelationships with maximum clarity. It is recognized, however, that full-time study is not always feasible or desirable and each of the seven areas of study which are set out in detail below can in fact be regarded as a self-contained module. Each of these modules can be studied separately - in series - rather than in parallel, as on a full-time course. The order in which modules are studied is not important except that area (a), Human communication: a foundation course, must be studied before all others and it is highly desirable that this should be followed by area (b), User studies. It goes without saying that if a particular elective builds from and assumes previous knowledge then it must follow and not precede the study of the area in which that subject is studied at basic level.

109. Equal weight is not attached to each area of study and for general guidance the following allocation of time over a complete basic programme is recommended:

area (a) - Human communications: a foundation course	7½%
area (b) - User studies	7½%
area (c) - Sources of information	20%
area (d) - Information/data storage and retrieval	20%
area (e) - Organizational aspects	20%
area (f) - Special study or dissertation	15%
area (g) - Electives	10%

110. Requirements of different functional categories. Implicit in the above allocation of time is the assumption that the objective is to prepare students, via a general course, for careers that may develop in a whole variety of directions; and that the programme will provide the essential generalist basis from which future specializations of all sorts will be able to develop. The proposed programme is suitable for operational staff, for R&D personnel and for future managers, though in the case of the last two categories it is assumed that they will need further and more specialized training as it becomes clear that their future lies in R&D work or management, respectively. If, as may sometimes be the case, it is known at the basic training stage that particular students are destined for R&D or management, it is at least in principle possible to alter the emphasis of the basic programme accordingly. In practice of course these students are likely to be members of a larger group, most of whom are likely to be destined for operational duties, and resources would not permit the provision of a special or individual R&D or management orientation for the relatively small number of students with special requirements. If, however, such individual treatment should prove to be feasible, it is recommended that for both categories of student the time devoted

to area (c) Sources of information and area (d) Information/data storage and retrieval should be reduced in each case from 20 per cent to 15 per cent of the total. In the case of future managers the time thus saved should be added to that allocated to area (e) Organizational aspects, thereby increasing that area's allocation to 30 per cent of the total time available. In the case of future R&D personnel the extra 10 per cent of time should be allocated to area (f) Special study or dissertation. With 20 per cent instead of 10 per cent of the total time available this area will assume a greatly - and appropriately - enhanced importance. Much more thorough and detailed attention to research methods and design will be feasible and the dissertation itself should be planned with a view to providing a realistic and effective lead-in to the type of R&D work with which the student's career is likely to be concerned.

111. Information analysts and computer specialists. It is not considered necessary for either of these specialist groups to cover the full range of courses set out below.

112. The information analyst requires above all specialist knowledge and expertise in the subject or subjects with which he is concerned. It is important however that he should be aware of the full context of which his activities form a part, and he should therefore cover area (a) Human communication: a foundation course. It is highly desirable that the information analyst should also study area (b) User studies, but if it is not feasible for the whole area to be covered he should at least study those sections of it which are concerned with his own specialist disciplines. Similarly, it would be valuable for the information analyst to study the whole of area (c) Sources of information, but if time does not permit this he should cover section (ii) (reference and bibliographical resources) and that part of section (iii) which takes in the disciplines with which he is concerned (see paragraph 117 below); for his practical work in this area, that part of it which is concerned with the presentation and dissemination of information is obviously of special importance. From area (d) Information/data storage and retrieval, he should extract sufficient to give an awareness of the more important systems and schemes. The practical component concerned with abstracting is of course particularly important to him. As much of the rest of the area should be covered as time and circumstances permit.

113. Computer specialists, like information analysts, should study area (a) Human communication: a foundation course, and also area (d) Information/data storage and retrieval, and parts of area (e) Organizations/aspects. Area (d) should be studied in its entirety; in area (e) it is probable that much of the content will already have been covered by the computer specialist's original training, but section (ii) (systems environments and objectives) and section (iv) (systems operation) - see paragraph 119 below - will obviously need to be studied from the specialized viewpoint of library and information studies.

114. Modules and their content. The recommended components of each individual area of study are set out below:

115. Area (a) Human communication: a foundation course

(i) theoretical aspects (for details see paragraph 82):

the information transfer process;

the nature of library and information science;

(ii) practical aspects:

national and international library and information infrastructures.

116. Area (b) User studies

(i) user behaviour and user needs:

general environmental factors (geography, culture, etc.);

characteristics of specialized environments, individual disciplines and groups of disciplines, professions/occupations.

(ii) user behaviour and user needs: specialist study

either a specialized environment, e.g. industry, government, higher education;

or a specialized group of disciplines - science and technology, social sciences, humanities;

or a specialized professional or occupational group, e.g. medical practitioners, agriculturists.

(iii) user survey methods; best studied as an element in a quantitative methods course, under area (e).

117. Area (c) Sources of information (documentary, audio-visual, computer-based and institutional)

(i) general survey (to encompass the whole spectrum of disciplines);

(ii) reference and bibliographical resources;

(iii) specialized study of information resources in

either science and technology;

or social sciences;

or humanities;

Practical - manual literature and reference searches

searches of computer data bases

presentation and dissemination of information.

118. Area (d) Information/data storage and retrieval

(i) principles of cataloguing, classification and indexing;

(ii) computer methods;

(iii) systems and schemes: comparative study and evaluation;

Practical - exercises in cataloguing

exercises in the use of selected bibliographical classification schemes

construction of a faceted classification scheme

exercises in thesaurus construction

exercises in abstracting

construction and running of an elementary computer programme.

119. Area (e) Organizational aspects

(i) management principles and techniques;

(ii) systems environments and objectives;

(iii) either national library and information systems

or academic library and information systems

or public library systems

or special library and information systems

or school libraries and resource centres;

(iv) systems operation;

(v) reprographics;

(vi) mechanization and automation;

(vii) quantitative methods.

120. Area (f) Special study or dissertation

Research methods. (This is envisaged as a brief course intended to outline the methods appropriate to different types of library/information research: historical, deductive, inductive, etc.; and also to cover the elements of research design to the extent required by the special study or dissertation.)

121. Area (g) Electives

The topics which follow are exemplary and not intended as a comprehensive list. The electives to be offered will depend above all on local resources and local needs.

Historical studies of library/information work
International and comparative librarianship and information work

Historical bibliography
Analytical and descriptive bibliography
Printing and book production
Publishing and the book trade

Archive administration and record management
Elements of palaeography

Library services for young people

Library planning

Advanced computer programming.

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(3) FOSKETT, D.J., NATIS. Preliminary Survey of Education and Training Programmes at University Level in Information and Library Science, Paris, Unesco, 1976, 149 pp. (document COM-75/WS/34).

(4) GRUNEWALD, H., Special Training Programme for Information Specialists, Paris, Unesco, 1976. (Restricted technical report, RP/1975-76/2. 131.4)

(5) IFLA, Standing Advisory Committee, Section of Library Schools, Standards for Library Schools, 1976.

APPENDIX

The following analysis of topics rated as important in the information science programmes of 45 North American schools is copied from H. Schur, Education and Training of Information Specialists for the 1970s, O.E.C.D., 1972.

Introduction to information science

Topics	Schools (total: 45)
Analysis of information	38
Information storage and retrieval	35
Indexing	31
Content analysis	30
Data processing	19
Bibliographic control	18
Library science and ISR	17
Information transfer	14
Information centres and mass communication	13
Information resources	10
Information needs	9

Fig. 5 "Important" topics in Introduction to information science courses.

Systems theory and applications

Topics	Schools (total: 45)
Systems analysis	24
OR and information systems	19
System design	16
Design of information systems	13
Evaluation of information retrieval systems	11
Management information systems	9
Information storage and retrieval	9
Information systems environment	9
Information transfer	7
Evaluation methodology	7
Measures of effectiveness	6

Fig. 6 "Important" topics in Systems theory and applications courses.

Mathematical methods in information science

Topics	Schools (total: 45)
Mathematical logic	10
Set theory	7
Probability distributions	5
Graph theory	3
Algorithms	3
Statistical analysis	3

Fig. 7 "Important" topics in Mathematical methods in information science courses.

Computer organization and programming systems

Topics	Schools (total: 45)
Computer programming	12
Data processing	10
Machine languages	6
File organization	4
Information storage and retrieval	4
Coding	3
Algorithms	3

Fig. 8 "Important" topics in Computer organization and programming systems courses.

Abstracting, indexing, cataloguing

Topics	Schools (total: 45)
Indexing	8
Abstracting	7
Content analysis	7
Classification	7
Auto-indexing	7
Extracting	6
Thesaurus	6
Co-ordinate indexing	5
Derived indexing	4
Information storage and retrieval	4
Bibliographic control	4
Consistency in indexing	3
Subject headings	3
Citation indexing	3

Fig. 9 "Important" topics in Abstracting, indexing, cataloguing courses.

Research Methods

Topics	Schools (total: 45)
Research techniques	5
Decision processes	4
Design of experiments	2
Evaluation methodology	2

Fig. 10 "Important" topics in Research methods courses.

Systems theory and applications

Topics	Schools (total: 45)
Analysis	
systems analysis	24
OR and information systems	19-25
Decision processes	4
Design	
System design	16
Design of information systems	13
Evaluation	
Evaluation methods	7-9
Measures of effectiveness	6
General	
Information system environment	9

Fig. 14 Cluster of "important" topics in systems theory and applications.

Mathematical tools

Topics	Schools (total: 45)
Mathematics	
Mathematical logic	10
Set theory	7
Graph theory	3
Statistical methods	
Probability distributions	5
Statistical analysis	3

Fig. 15 Cluster of "important" topics in mathematical tools.

Research methods and simulation

Topics	Schools (total: 45)
Research methods	5
Design of experiments	2

Fig. 16 Cluster of "important" topics in research methods and simulation.

Computers and computing

Topics	Schools (total: 45)
Theoretical	
Algorithms	3-6
Applied	
Computer programming	12
Machine language	6

Fig. 17 Cluster of "important" topics in computers and computing.

The following analysis is based on the information science programmes of one school in the Netherlands (N1), Sweden (S1), the United Kingdom (UK1) and Yugoslavia (Y1) and on two programmes from France (F1 and F2), and two from the Federal Republic of Germany (G1 and G2). It is copied from H. Schur, Education and Training of Information Specialists for the 1970s, O.E.C.D., 1972.

Topic	Programme							
	N1	S1	G1	F2	F1	Y1	UK1	G2
1. Generation and use of data bases								
(1) Generation and use of data bases		o	o	o		x	x	o
(2) Human communication						o		
2. Data bases and their characteristics								
(1) Data base sources and resources	x	o	x	o	x	x	x	o
(2) Macro- and micro-characteristics of data bases	x	o	x	x	o	o	x	o
(3) Natural and formal languages			o	o	o	o		x
3. Organization and dissemination of data								
(1) Data acquisition, description, compression	x	o	x	o	x	x	x	o
(2) Taxomonies, classification of data	x	o	x	x	o	o	x	x
(3) Indexes and indexing	o	x	x	o	x	o	x	x
(4) File structure and organization for retrieval							o	x
(5) Data transmission, communication, dissemination	o	x	x	o	o	x	o	
4. ISR systems								
(1) ISR systems analysis and design			o				x	
(2) System/system and system/man interfaces								
(3) ISR systems and systems networks	o	o	x	x	o		x	o
(4) ISR systems environments	o						x	
(5) ISR systems operation	x	x	x	o	x	x	x	o
5. Theoretical and technical tools								
(1) Mathematical foundations			o	o	o	o		x
(2) Research methods								
(3) Operational research			o	o			o	x
(4) Statistical methods of research			o		o	o	x	x
(5) Management principles and techniques (including financial management)			x		o		x	
(6) Technical equipment for ISR systems: characteristics and use (including computers)	o	x	x	x	x	o	x	x
6. Special topics								
(1) Advanced computer programming and organization				o	x	opt	x	x

x = major topic within the particular programme
o = minor topic within the particular programme

Fig. 19 Major and minor topics in eight European programmes for information specialists (post-graduate level).